

Appl. No. 10/815,561
Amdt. Dated September 25, 2006
Reply to Office action of July 5, 2006

REMARKS/ARGUMENTS

Claims 1-26 and 30-32 are pending in the present application.

This Amendment is in response to the Office Action mailed July 5, 2006. In the Office Action, the Examiner rejected claims 1-26 and 30-32 under 35 U.S.C. §103(a). Reconsideration in light of the remarks made herein is respectfully requested.

Rejection Under 35 U.S.C. § 103

In the Office Action, the Examiner rejected claims 31-26 and 30-32 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,897,089 issued to Farnworth ("Farnworth") in view of U.S. Patent no. 6,730,617 issued to Carter ("Carter"). Applicant respectfully traverses the rejection and submitss that the Examiner has not met the burden of establishing a prima facie case of obviousness.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *MPEP §2143, p. 2100-129 (8th Ed., Rev. 2, May 2004)*. Applicants respectfully contend that there is no suggestion or motivation to combine their teachings, and thus no *prima facie* case of obviousness has been established.

Farnworth discloses a method and system for fabricating semiconductor components using wafer level contact printing. A die includes a pattern of die contacts 18 formed on a circuit side 20 (Farnworth, col. 3, lines 34-35). A polymer layer 24 is formed on the circuit side 20 of a substrate 14 (Farnworth, col. 3, lines 43-44). A stencil 26 is then provided which includes a plurality of patterns 28 (Farnworth, col. 4, lines 13-15). Each of the patterns 28 is adapted to imprint a complementary pattern 36 in the polymer layer 24, with each die 12 including at least one complementary pattern 36 (Farnworth, col. 4, lines 22-25). Then, an alignment step is performed in which the stencil 26 is aligned with the substrate 14 (Farnworth, col. 4, lines 35-37). Then, a contact printing step is performed in which the stencil 26 is placed in contact with the polymer layer 24 to form a patterned polymer layer 24P imprinted with the complementary

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patterns 36 (Farnworth, col. 4, lines 64-67). None of these steps includes exposing a bond pad on the substrate by local flow of the polymer.

Carter discloses a method of fabricating one or more tiers of integrating circuit. A layer 26 is deposited onto a substrate 20 (Carter, col. 4, lines 22-23). The layer 26 is then brought into contact with a stamp 34 having an appropriately patterned stamping surface 40 (Carter, col. 5, lines 4-6). Heat may be applied to the substrate 20 and/or the stamp 34 so that heat is transferred to the layer 26, thereby effecting solvent removal and/or partial or full curing of the material in the layer 26 (Carter, col. 5, lines 19-22).

Farnsworth and Carter, taken alone or in any combination, do not disclose, suggest, or render obvious, at least one of (1) forming an imprinted polymer disposed upon a substrate under one of a thermal load and a vibratory load to expose a bond pad on the substrate by local flow of the polymer, wherein a recess is formed in the polymer, (2) attaching a solder bump to the bond pad, and (3) curing the polymer, as recited in claim 1; or (1) placing a polymer film over a substrate, (2) imprinting the polymer film under one of a thermal load and a vibratory load to expose a bond pad on the substrate by local flow of the polymer film, wherein a recess is formed in the polymer film, (3) attaching a solder bump to the bond pad, and (4) curing the polymer film, as recited in claim 17; or (1) forming an imprinted polymer disposed upon a substrate under one of a thermal load and a vibratory load to expose a bond pad on the substrate by local flow of the polymer, wherein a recess is formed in the polymer, (2) filling a solder flux into the recess, (3) attaching a solder bump to the bond pad, and (4) curing the polymer, wherein curing the polymer forms a cured polymer film that comprises a film-to-substrate thickness ratio in a range from about one-tenth to about one-half the thickness of the substrate, as recited in claim 30.

Farnworth merely discloses performing a contact printing step in which the stencil 26 is placed in contact with the polymer layer 24 to form a patterned polymer layer 24P imprinted with the complementary patterns 36 (Farnworth, col. 4, lines 64-67). A contact printing step is not the same as causing a local flow of the polymer. Additionally, Farnworth does not disclose a convex over-all profile as recited in claims 5 and 31.

In addition, Farnsworth merely discloses using a vacuum tool 38 to push the stencil 26 into the polymer layer 24P (Farnworth, col. 5, lines 1-2). The mere pushing of the stencil 26 into

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the polymer layer 24P does not cause a local flow. Furthermore, Farnworth discloses that one or more mechanical rollers 44 can be rolled over the stencil 26 to push the features 30, 32, 34 into the polymer layer 24 (Farnworth, col. 5, lines 2-5). Since the rollers 44 are used to roll over the stencil 26, without more, an overall pressure is created to push the entire stencil into the polymer. This cannot create a local flow.

Moreover, Farnworth merely discloses that the recessed features 50 are formed by the features 30 (FIG. 2D) on the stencil 26. Farnworth further discloses that the recessed features 50 can comprise openings, pockets, or grooves (Farnworth, col. 5, lines 12-15). Since there are openings, pockets, or grooves, they cannot form a convex over-all profile.

Carter merely discloses applying heat to the substrate 20 and/or the stamp 34 to transfer heat to the layer (Carter, col. 5, lines 19-22), not to expose a bond pad on the substrate by local flow of the polymers. As shown in Figure 4 in Carter, the heat is applied for the entire substrate 20 to remove solvent or cure the layer 26, not causing a local flow of the polymer. Furthermore, the stamp 34 merely has a pattern of relief structures (Carter, col. 5, lines 6-8), not a convex overall profile.

There is no motivation to combine Farnsworth and Carter because neither of them addresses the problem of embossing processes for substrate imprinting. There is no teaching or suggestion that exposing a bond pad by local flow of the polymer is present. Farnsworth, read as a whole, does not suggest the desirability of forming an imprinted polymer under one of a thermal load and a vibratory load. For the above reasons, the rejection under 35 U.S.C. §103(a) is improperly made.

The Examiner failed to establish a prima facie case of obviousness and failed to show there is teaching, suggestion, or motivation to combine the references. When applying 35 U.S.C. 103, the following tenets of patent law must be adhered to: (A) The claimed invention must be considered as a whole; (B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination; (C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and (D) Reasonable expectation of success is the standard with which obviousness is determined. Hodosh v. Block Drug Co., Inc., 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986). "When determining the patentability of a claimed invention which combined two known

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elements, 'the question is whether there is something in the prior art as a whole suggest the desirability, and thus the obviousness, of making the combination.'" In re Beattie, 974 F.2d 1309, 1312 (Fed. Cir. 1992), 24 USPQ2d 1040; Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co., 730 F.2d 1452, 1462, 221 USPQ (BNA) 481, 488 (Fed. Cir. 1984). To defeat patentability based on obviousness, the suggestion to make the new product having the claimed characteristics must come from the prior art, not from the hindsight knowledge of the invention. Interconnect Planning Corp. v. Feil, 744 F.2d 1132, 1143, 227 USPQ (BNA) 543, 551 (Fed. Cir. 1985). To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the Examiner to show a motivation to combine the references that create the case of obviousness. In other words, the Examiner must show reasons that a skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the prior elements from the cited prior references for combination in the manner claimed. In re Rouffet, 149 F.3d 1350 (Fed. Cir. 1996), 47 USPQ 2d (BNA) 1453. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or implicitly suggest the claimed invention or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." Ex parte Clapp, 227 USPQ 972, 973. (Bd.Pat.App.&Inter. 1985). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Furthermore, although a prior art device "may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so." In re Mills 916 F.2d at 682, 16 USPQ2d at 1432; In re Fritch, 972 F.2d 1260 (Fed. Cir. 1992), 23 USPQ2d 1780.

In the present invention, the cited references do not expressly or implicitly suggest any of the above elements. In addition, the Examiner failed to present a convincing line of reasoning as to why a combination of Farnsworth and Carter is an obvious application of embossing processes for substrate imprinting using a local flow of polymer.

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In summary, Applicant believes that independent claims 1, 17, and 30 and their respective dependent claims are distinguishable over the cited prior art references. Accordingly, Applicant respectfully requests the rejections under 35 U.S.C. §103(a) be withdrawn.

Conclusion

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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